

REMARKS

Claim 110 is amended. Claim 111 is cancelled. Claims 16, 19-39 and 110 are pending in the application.

Claim 111 stands objected to due to informalities. The Examiner indicates that since claim 110 recites "consisting essentially of", claim 111 should recite "consisting essentially of" rather than "comprising". Without admission as to the propriety of the Examiner's objection claim 111 is cancelled.

Claims 16 and 19-39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Perry (U.S. Patent No. 6,896,748), or over Perry in combination with Pavate (U.S. Patent No. 6,391,163). The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 16 and 19-39 are allowable over Pavate and Perry for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every element in any of those claims.

Independent claim 16 recites a copper alloy sputtering target containing less than or equal to about 99.99% copper having an average grain size of less than 1 micron, with a grain size uniformity standard deviation throughout the target of less than or equal to about 15% (1-sigma). As acknowledged by the Examiner at page 3 of the present Action, Pavate does not teach or suggest the recited grain size of the sputtering target as recited in claim 16. Nor does Pavate disclose or suggest the recited grain size uniformity being less than or equal to about 15% (1-sigma) throughout the target. The Examiner indicates reliance on

Perry as disclosing a target that achieves a grain size as small as 0.1 micron (referring to the abstract and column3, lines 42-46), and further indicates that Perry teaches a process which achieves a uniform microstructure throughout the target. Referring to the Perry disclosure at column 3, lines 42-46 it is noted that such disclosure indicates achieving grains having a grain size of less than 10 microns with best cases being targets having grain size levels less than about 8 microns. It is further indicated that in some instances a material can be produced with grains that range in size from about 0.1 to 7.5 microns. Such disclosure does not teach or suggest a material having the recited average grain size of less than 1 micron. Nor does such disclosure teach or fairly suggest a uniformity of grain size such that the standard deviation throughout the target is less than or equal to about 15% of 1-sigma in addition to an average grain size of less than 1 micron.

At page 8 of the Action, the Examiner indicates that the Perry methodology could potentially be utilized to produce the targets as set forth in applicant's claims. The Examiner relies upon Perry's teaching of a sputtering target "formed with a recrystallization annealing step at a temperature below 350°C and preferably at 150°C-320°C" (present action at page 8). Referring to applicant's specification at, for example, paragraph 62, such specifically indicates utilizing a sub-crystallization temperature for intermediate annealing performed during equal channel angular extrusion processing, which can preferably comprise temperatures from about 150°C to about 350°C. Such disclosure further indicates that a temperature below the crystallization temperature is utilized to maintain an average grain size of less than 1 micron. Perry, on the other hand, specifically indicates utilizing a temperature which under the circumstances will recrystallize the specific material being processed. Accordingly, the processing methodology of Perry is

distinctly different from that of the applicant and does not support the Examiner's contention of similar or identical products. Therefore the combination of Pavate and Perry does not disclose or suggest the claim 16 recited target containing less than or equal to about 99.99% copper and having an average grain size of less than 1 micron with a grain size uniformity standard deviation throughout the target of less than or equal to about 15% (1-sigma).

Claims 19-28 are allowable over the combination of Perry and Pavate for at least the reason that they depend from allowable base claim 16.

Independent claim 29 recites a copper alloy sputtering target consisting essentially of less than or equal to about 99.99% copper and at least one alloying element where the target has an average grain size from 1 micron to about 20 microns, with a grain size uniformity standard deviation of less than about 15% (1-sigma) throughout the target. As indicated above, Pavate does not disclose or suggest the recited grain size uniformity standard deviation of less than 15% (1-sigma) throughout the target. Perry discloses introducing strain to a target blank to produce uniform microstructure through a target thickness (col. 4, ll. 14-17). However, disclosure of a general uniformity does not teach or suggest the high degree of uniformity specifically recited in claim 29. Further, Perry discloses achieving a material having grain sizes ranging from 0.1 – 7.5 microns. Such range of grain size within a material does not indicate or suggest achieving the recited grain size uniformity having a standard deviation of less than about 15% (1-sigma) throughout the target as recited in independent claim 29.

Nor does the methodology described in Perry suggest achieving such grain size. As disclosed in applicant's specification (Fig. 1, step 200 and the accompanying text) the

preliminary treatment including heat treatment is at least partially responsible for the achievement of small grain size and grain size uniformity in the targets produced in accordance with the invention. Perry does not disclose or suggest any such processing event. Accordingly, the combination of Pavate and Perry fails to disclose or suggest the claim 29 recited target having an average grain size of from 1 to about 20 microns with a grain size uniformity standard deviation of less than about 15% (1-sigma) throughout the target.

Dependent claims 30-39 are allowable over the combination of Pavate and Perry for at least the reason that they depend from allowable base claim 29.

Pending claim 110 stands rejected under 35 U.S.C. § 103 as being unpatentable over a combination of Perry and Weinzerl (U.S. Patent No. 6,645,352). Independent claim 110 recites a copper alloy sputtering target containing less than or equal to about 99.99% copper and at least one alloying element selected from the recited group of alloying elements, and having a hardness of at least 40 HB. As acknowledged by the Examiner at page 6 of the present Action, Perry does not disclose or suggest the identity of alloying elements or the recited hardness of the resulting alloy. Weinzerl is relied upon as disclosing a copper-palladium sputtering target. Without admission as to the propriety of the Examiner's rejection, claim 110 is amended to no longer recite palladium. Accordingly, claim 110 is allowable over the combination of Perry and Weinzerl.

For the reasons discussed above, pending claims 16, 19-39 and 110 are allowable. Accordingly, applicant respectfully requests formal allowance of such pending claims in the Examiner's next action.

Respectfully submitted,

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